

What is claimed is:

1. A memory matrix module for use in a data network, the memory matrix module comprising:
 - 5 at least one memory array having a plurality of memory devices arranged in a plurality of banks, each memory device capable of storing data therein;
 - at least one memory controller coupled to the memory array and capable of accessing the memory devices; and
 - a cache coupled to the memory controller, the cache having stored therein one or
- 10 more copies of a data allocation table (DAT) adapted to describe data stored in the memory devices.
2. A memory matrix module according to claim 1, wherein each of the banks has multiple ports, and wherein the multiple ports and the DAT in the cache enable the
- 15 memory controller to access different memory devices in different banks simultaneously.
3. A memory matrix module according to claim 1, wherein the data network is configured to connect a plurality of data processing systems to the memory system, and wherein the memory matrix module is configured to enable different data processing
- 20 systems to access the memory array simultaneously.
4. A memory matrix module according to claim 3, wherein the memory matrix module is configured to enable a first data processing system to write to the memory array while simultaneously a second data processing system reads from the memory
- 25 array.
5. A memory matrix module according to claim 1, wherein the memory devices comprise random access memory (RAM) devices.
- 30 6. A memory system for storing data therein for use in a data network, the memory system comprising:
 - at least one memory matrix unit having at least one memory subsystem, the memory subsystem including:
 - a memory array having a plurality of memory devices arranged in a

plurality of banks, each memory device capable of storing data therein;

a memory controller coupled to the memory array and capable of accessing the memory devices; and

- a cache coupled to the memory controller, the cache having stored therein
5 one or more copies of a data allocation table (DAT) adapted to describe data stored in the memory devices; and

at least one management unit coupled to at least one memory matrix unit and to the data network to interface between the memory matrix unit and the data network.

- 10 7. A memory system according to claim 6, wherein each of the banks has multiple ports, and wherein the multiple ports and the DAT in the cache enable the memory controller to access different memory devices in different banks simultaneously.

8. A memory system according to claim 6, wherein the data network is configured
15 to connect a plurality of data processing systems to the memory system, and wherein the memory system is configured to enable different data processing systems to access the memory array simultaneously.

9. A memory system according to claim 8, wherein the memory system is configured
20 to enable a first data processing system to write to the memory array while simultaneously a second data processing system reads from the memory array.

10. A memory system according to claim 6, wherein the memory devices comprise
random access memory (RAM) devices.

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11. A memory system according to claim 6, further comprising a non-volatile storage unit having at least one non-volatile storage device to provide backup of data stored in the memory matrix unit.

- 30 12. A memory system according to claim 11, wherein the non-volatile storage unit comprises a magnetic, optical, or magnetic-optical disk drive.

13. A memory system according to claim 11, wherein the non-volatile storage unit comprises a plurality of hard disk drives, and wherein the hard disk drives are connected

in a RAID configuration to provide mirrored copies of data in at least one memory matrix unit.

14. A memory system according to claim 11, wherein the non-volatile storage unit
5 comprises a plurality of hard disk drives, and wherein the hard disk drives are connected in a RAID Level 0 configuration to reduce the time to backup data in at least one memory matrix unit.

15. A memory system according to claim 11, wherein the non-volatile storage unit
10 comprises a plurality of hard disk drives, and wherein the hard disk drives comprises a hard disk drive adapted to create a continuous backup of data in at least one memory matrix unit on a periodic basis.

16. A memory system according to claim 6, further comprising an off-line storage
15 unit having removable storage media to provide off-line storage of data stored in at least one memory matrix unit.

17. A memory system according to claim 16, further comprising an uninterruptible
20 power supply (UPS) configured to supply power to at least one management unit, at least one memory matrix unit, the non-volatile storage unit, and the off-line storage unit from an electrical power line, and, in the event of a variation in power from the electrical power line, to provide power from a battery.

18. A memory system according to claim 17, wherein the UPS is configured to
25 transmit a signal to the management unit on variation of power from the electrical power line exceeding a first predetermined amount, and wherein the management unit is configured to create a backup copy of at least one memory matrix unit in the non-volatile storage unit.

30 19. A memory system according to claim 18, wherein at least one management unit is further configured, on variation of power from the electrical power line exceeding a second predetermined amount, to:

signal users of the memory system in the data network; and
perform a controlled shutdown of the memory system.

20. A memory system according to claim 18, wherein at least one management unit is further configured on restoration of power from the electrical power line to:

restore the contents of at least one memory matrix unit from the backup copy of the memory matrix stored in the non-volatile storage unit;

5 reactivate the memory matrix as a primary memory;

reactivate other memory matrixes as secondary memories if previously configured as secondary memories; and

reactivate the non-volatile storage unit as a secondary memory, thereby returning the memory system to normal operating condition.

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21. A memory system according to claim 20, wherein at least one management unit is further configured on restoration of power from the electrical power line, if the non-volatile storage unit is unavailable, to restore at least one memory matrix unit directly from another backup copy of the memory matrix unit stored in removable storage media in an off-line storage unit.

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22. A memory system according to claim 6, wherein the data network is based on either physical wire or wireless connections.